UNITED STATES PATENT AND TRADEMARK OFFICE

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>26 November 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-39</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-39</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>26 November 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All   b)☐ Some *   c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

2.   **Claims 35, 36, 37, 38 and 39** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows.

3.   **Claims 35, 36, 37, 38 and 39** recite "**A computer program for analyzing image data comprising....**" embodying functional descriptive material However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed " a computer program " (line 1 of claims 35, 36, 37, 38 and 39) can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The Examiner suggests amending the claim such as "**A computer-readable medium embodied with a computer program for analyzing image data comprising...**" or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

5.   Claims 1-8, 14, 25,30 and 35 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Taguchi et al (U. S. 5,807,256) in view of Kao et al (U. S. 5,361,763).

Regarding claim 1, Taguchi discloses a method for analyzing image data

comprising:

analyzing the temporal change image (please note, to column 64, lines 60-65)

via at least one CAD algorithm (please note, to column 81, lines 25-41).

However, Taguchi is silent about the specific details regarding the step of:

generating a temporal change image based upon first and second images from

different times by segmenting the first and second images and registering at least a

portion of the segmented images with one another.

In the same field (medical imaging) endeavor, however, Kao discloses a method for

segmenting features in an image comprising the step of:

generating a temporal change image (please note, to column 13, lines 54-61)

based upon first and second images from different times (please note, to column 6,

lines 50-62) by segmenting the first and second images (please note, to column 2, lines 37-47) and registering (please note, to column 2, lines 9-14) at least a portion of the segmented images with one another (please note, to column 14, lines 24-26).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use image segmentation as taught Kao in the system of Taguchi because Kao provides Taguchi an improved method and system to produce a separate image containing a segmented feature from the acquired image and information about the fractional quantity of each feature in the elements of the acquired image.

Regarding claim 2, Taguchi discloses the method of claim 1, wherein analyzing the temporal change image via the CAD algorithm includes diagnosing a physical condition of a patient (please note, to column 115, lines 34-40).

Regarding claim 3, Taguchi discloses the method of claim 1, wherein the CAD algorithm identifies at least one feature of interest in the temporal change image (please note, to column 5, lines 17-25 and column 45, lines 62-67).

Regarding claim 4, Taguchi discloses the method of claim 1, comprising performing quantitative analysis on the temporal change image (please note, to column 56, lines 25-30).

Regarding claim 5, Taguchi discloses the method of claim 4, wherein the quantitative analysis includes determining a change in size of a feature of interest between the first and second images based upon the temporal change image (please note, to column 115, lines 18-27).

Regarding claim 6, Taguchi discloses the method of claim 1, comprising

presenting a report to a user along with at least one of the first image, the second image

and the temporal change image (please note, to column 13, lines 30-35 and column 67,

lines 25-31).

Regarding claim 7, Taguchi discloses the method of claim 1, wherein the first

and second images are generated by different imaging modalities (please note, to

column 2, lines 47-52 and column 106, lines 18-23).

Regarding claim 8, Taguchi discloses the method of claim 1, comprising

analyzing at least the first image via a second CAD algorithm (please note, to column

64, lines 60-65 and column 81, lines 25-41).

Claim 14 is similarly analyzed as claim 1 above.

Claim 25 is similarly analyzed as claim 1 above.

Claim 30 is similarly analyzed as claim 1 above.

Regarding claim 35, Taguchi discloses a computer program for analyzing image

data comprising:

at least one machine readable medium (please note, to column 101, lines 9-15);

and code stored on the at least one machine readable medium for analyzing the

temporal change image (please note, to column 64, lines 60-65) via at least one CAD

algorithm (please note, to column 81, lines 25-41).

However, Taguchi is silent about the specific details regarding the step of:

generating a temporal change image based upon first and second images from

different times by segmenting the first and second images and registering at least a

portion of the segmented images with one another.

In the same field (medical imaging) endeavor, however, Kao discloses a method for

segmenting features in an image comprising the step of:

generating a temporal change image (please note, to column 13, lines 54-61)

based upon first and second images from different times (please note, to column 6,

lines 50-62) by segmenting the first and second images (please note, to column 2, lines

37-47) and registering (please note, to column 2, lines 9-14) at least a portion of the

segmented images with one another (please note, to column 14, lines 24-26).

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to use image segmentation as taught Kao in the system of Taguchi

because Kao provides Taguchi an improved method and system to produce a separate

image containing a segmented feature from the acquired image and information about

the fractional quantity of each feature in the elements of the acquired image.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7.   Claims 9-13, 15-24, 26-29, 31-34 and 36-39 are rejected under 35 U.S.C. 102(b)

as being anticipated by Taguchi et al (U. S. 5,807,256).

Regarding claim 9, Taguchi discloses a method for analyzing image data

comprising:

analyzing a first image via at least one CAD algorithm to identify a feature of

interest (please note, to column 64, lines 60-65 and column 81, lines 25-41); and,

if a feature of interest is identified in the first image, accessing a second image

from a different time than the first image (please note, to column 6, lines 50-62 and

column 81, lines 25-41) and generating a temporal change image based upon the first

and second images (please note, to column 64, lines 60-65).

Regarding claim 10, Taguchi discloses the method of claim 9, comprising

reporting results of the analysis to a user if a feature of interest is not identified in the

first image (please note, to column 13, lines 30-35 and column 67, lines 50-58).

Regarding claim 11, Taguchi discloses the method of claim 9, comprising

analyzing the temporal change image via a second CAD algorithm (please note, to

column 64, lines 60-65).

Regarding claim 12, Taguchi discloses the method of claim 11, wherein the CAD

algorithm used for analyzing the first image is different from the CAD algorithm used for

analyzing the temporal change image (please note, to column 64, lines 60-65 and

column 81, lines 25-41).

Regarding claim 13, Taguchi discloses the method of claim 12, wherein the CAD

algorithm used for analyzing the first image has a sensitivity and a specificity to produce

a desired level of positive identifications of potential features of interest (please note, to

column 83, lines 6-12), and wherein the CAD algorithm used for analyzing the temporal

change image is configured to reduce the positive identifications of features of interest

(please note, to column 17, lines 10-27).

Claim 15 is similarly analyzed as claim 4 above.

Claim 16 is similarly analyzed as claim 5 above.

Claim 17 is similarly analyzed as claim 6 above.

Regarding claim 18, Taguchi discloses a method for analyzing image data comprising:

analyzing first and second images from two different times via at least one CAD algorithm to identify a feature of interest (please note, to column 64, lines 60-65 and column 81, lines 25-41);

comparing the results of the analyses (please note, to column 7, lines 14-18); and,

generating a temporal change image based upon the comparison (please note, to column 7, lines 14-18 and column 48, lines 49-52).

Regarding claim 19, Taguchi discloses the method of claim 18, comprising analyzing the temporal change image via CAD algorithm to diagnose a physical condition of a patient (please note, to column 115, lines 34-40).

Claim 20 is similarly analyzed as claim 9 above.

Regarding claim 21, Taguchi discloses the method of claim 18, comprising determining whether a discrepancy exists between the analyses of the fist and second images, and wherein the temporal change image is generated only if such a discrepancy is identified (please note, to column 5, lines 51-61 and column 35, lines 7-10).

Claim 22 is similarly analyzed as claim 18 above.

Regarding claim 23, Taguchi discloses the method of claim 22, comprising receiving results of a read of at least one of the first and second images by a human reader, and wherein the reconciler identifies differences between the analyses of the first and second images and the results of the read by the human reader (please note, to column 24, lines 36-39).

Claim 24 is similarly analyzed as claim 9 above.

Regarding claim 26, Taguchi discloses the method of claim 24, wherein the CAD algorithm used for analyzing the first image is different from the CAD algorithm used for analyzing the second image (please note, to column 81, lines 50-53).

Regarding claim 27, Taguchi discloses the method of claim 24, comprising comparing results from the analyses of the first and second images during multiple stages of analysis via the CAD algorithm (please note, to column 7, lines 14-18).

Claim 28 is similarly analyzed as claim 9 above.

Regarding claim 29, Taguchi discloses the method of claim 28, wherein analyzing the first and second images includes quantifying a change in a feature of interest between the first image and the second image (please note, to column 56, lines 25-30).

Claim 31 is similarly analyzed as claim 9 above.

Claim 32 is similarly analyzed as claim 18 above.

Claim 33 is similarly analyzed as claim 24 above.

Claim 34 is similarly analyzed as claim 28 above.

Regarding claim 36, Taguchi discloses a computer program for analyzing image data comprising:

at least one machine readable medium (please note, to column 101, lines 9-15); and code stored on the at least one machine readable medium for analyzing a first image via at least one CAD algorithm to identify a feature of interest (please note, to column 64, lines 60-65 and column 81, lines 25-41), and if a feature of interest is identified in the first image (please note, to column 6, lines 50-62 and column 81, lines 25-41), accessing a second image from a different time than the first image and generating a temporal change image based upon the first and second images (please note, to column 64, lines 60-65).

Regarding claim 37, Taguchi discloses a computer program for analyzing image data comprising:

at least one machine readable medium (please note, to column 101, lines 9-15); and code stored on the at least one machine readable medium for analyzing first and second images from two different times via at least one CAD algorithm to identify a feature of interest (please note, to column 64, lines 60-65 and column 81, lines 25-41), comparing the results of the analyses (please note, to column 7, lines 14-18), and generating a temporal change image based upon the comparison (please note, to column 7, lines 14-18 and column 48, lines 49-52).

Claim 38 is similarly analyzed as claim 24 above.

Claim 39 is similarly analyzed as claim 28 above.

Other Prior Art Cited

8.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Burke et al (U. S. 6,421,454 B1) disclose optical correlator assisted detection of calcifications for breast biopsy.

Roehring et al (U. S. 6,075,879) disclose method and system for computer-aided lesion detection using information from multiple images.

Doi et al (U. S. 6,836,558 B2) disclose method, system and computer readable medium for identifying chest radiographs using image mapping and template matching techniques.

Contact Information

9.   Any inquiry concerning this communication or earlier communications from the Examiner should be directed to ABOLFAZL TABATABAI whose telephone number is (571) 272-7458.

The Examiner can normally be reached on Monday through Friday from 9:30 a.m. to 7:30 p.m. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Bhavesh Mehta, can be reached at (571) 272-7453. The fax phone number for organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Abolfazl Tabatabai

Patent Examiner

Technology Division 2624

April 24, 2007